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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/585,446

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EXAMINER

LE, HOA T

ART UNIT

PAPER NUMBER

1788

NOTIFICATION DATE

DELIVERY MODE

02/04/2011

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/585,446	Applicant(s) TSUZUKI ET AL.	
	Examiner H. (Holly) T. Le	Art Unit 1788	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 November 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 7-38 is/are pending in the application.
- 4a) Of the above claim(s) 21-38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 7-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Election/Restrictions

2. Claims 1 and 7-38 are pending. Claims 21-38 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on May 20, 2010.

Claim Rejections - 35 USC § 103

3. Claims 1 and 7-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 56-000,834 (“JP’834”).

Claim 1: JP’834 teaches inorganic powder, in particular alumina powder, having a bimodal particle size distribution: from 0.8 to 2.5 μm , 4 to 18 μm and 25 to 40 μm . Therefore, the powder necessarily exhibits at least two peaks, one in the 0.8 to 2 μm and at least one in the 4 to 40 μm regions, which are within the claimed two peak regions. See abstract and table 1. Although JP’834 does not specifically report the various ranges of mode size and particle size of the powder as claimed, it is known that particles of bimodal or multimodal particle size distribution are preferred for packing efficiency as the smaller particles would fill in the gaps between the larger particles. It has been held that a conclusion of obviousness would include (1) combining prior art elements according to known methods to yield predictable results and/or (2) obvious to

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try- choosing from finite number of identified, predictable solutions, with a reasonable expectation of success. KSR, 550 U.S, 82 USPQ2d at 1396. Here, selection various particle size for a powder is known, the result is predictable (packing efficiency), and selection of frequency size distribution requires no additional effort. Therefore, selection of particles having the particle size and mode size within the ranges as claimed would have been obvious.

Claims 7-9: Spherical particles are favored over non-spherical for dispersibility and flowability. Therefore, it would have been obvious to select more particles that are spherical or close to being spherical (i.e. spheroidicity larger than 0.5) and fewer particles that are non-spherical (i.e. low spheroidization ratio).

Claim 10: The thermal conductivity as claimed are the intrinsic properties associated with the alumina powders having the bimodal particle size distribution as the alumina powder taught in JP'834.

Claim 11: The inorganic powder taught by JP'834 is alumina powder. See abstract.

Claim 15: It would have been obvious to select aluminum oxide as pure as possible; therefore, a low content of free aluminum as claimed would have been obvious.

Claims 16-17: The alumina of JP'834 does not contain any sulfur or chlorine; therefore, the content of sulfate ion or chlorine ion is necessarily substantially zero.

Claim 18: The alumina does not contain any iron; therefore, the content of iron oxide is necessarily substantially zero.

Claim 19: The smallest particle size is 0.8 μm which is 800 nm; therefore, the alumina contains no particles less than 50 nm.

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Claim 20: Hydrophobizing inorganic metal oxide powder, in particular alumina powder, with a silane-coupling agent is commonly done in the art. See for example, US 5,379,753; US 7,081,234 or US 7,323,280.

4. Claims 1 and 7-20 are rejected under 35 U.S.C. 103(a) as obvious over US 6,284,829 ("US'829").

Claim 1: US'829 teaches inorganic powder having a bimodal particle size distribution in the range of 0.1 to 5 μm and 15 to 35 μm and a maximum particle size of 40 μm . See US'829, col. 2, lines 60-65. More particularly, US'829 teaches smaller-sized powder having a bimodal particle size distribution with a first domain in the order of 2 μm and a second domain in the order of 0.2 μm (col. 3, lines 9-15). Therefore, the inorganic powder taught by US'829 necessarily has at least two peaks within the claimed ranges of 0.2 to 2 μm and 2 to 63 μm . US'829 teaches that the distribution of the large-sized particles is 85 to 95% and the smaller-sized particles is 5 to 15% (col. 3, lines 15-19). This range overlaps the claimed range, therefore, the frequency particle distribution ranges as described are considered obvious. In addition, selection of various particle size ranges would have been obvious as matter of choice for the predictable result which is packing efficiency.

Claims 7-9: Spherical particles are favored over non-spherical for dispersibility and flowability. Therefore, it would have been obvious to select more particles that are spherical or close to being spherical (i.e. spheroidicity larger than 0.5) and fewer particles that are non-spherical (i.e. low spheroidization ratio).

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Claim 10: The thermal conductivity as claimed is an intrinsic thermal conductivity of alumina, and the powder taught in US'829 includes alumina (col. 3, lines 20-21).

Claim 11: the powder comprises alumina (col. 3, lines 20-21).

Claims 16-17: Alumina powder contains no sulfur or chlorine; therefore, the sulfate ion or chlorine ion in the powder is substantially zero.

Claim 18: The alumina does not contain any iron; therefore, the content of iron oxide is necessarily substantially zero.

Claim 19: Both smaller-sized particles and larger-sized particles start at 0.1 microns (col. 2, lines 60-65 and col. 3, lines 9-15); therefore, the smallest particle size is 100 nm.

Claim 20: Hydrophobizing inorganic metal oxide powder, in particular alumina powder, with a silane-coupling agent is commonly done in the art. See for example, US 5,379,753; US 7,081,234 or US 7,323,280.

5. Claims 1 and 7-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admission of simple manipulation of commercially available products as set forth in the last office action and further discussed below.

Applicant argued that "the present invention is more than a simple mixing or simple manipulation of commercially available products and that applicants have selected specific conditions that lead to results that are not obtained from a simple mixing of any commercially available inorganic powders". The "specific conditions" are the intrinsic properties of the commercially available products. Therefore, selecting

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those conditions requires no special effort or technical complexity. It would have been obvious to mix particles of various sizes because it is known that mixing various particles of different sizes improving packing efficiency because the smaller ones would fill the gaps between the larger ones. Therefore, it would have been obvious to try mixing various particles of different sizes to arrive at high packing efficiency and thus improve thermal conductivity. Selecting particles of different particle sizes requires no special effort or technical complexity; therefore, the powder with the frequency distribution as claimed would have been obvious to one skill in the art. KSR, 550 U.S., 82 USPQ2d at 1396. Similarly, spherical particles are favored over non-spherical for dispersibility and flowability. Therefore, it would have been obvious to select more particles that are spherical or close to being spherical (i.e. spheroidicity larger than 0.5) and fewer particles that are non-spherical (i.e. low spheroidization ratio).

Conclusion

6. Applicant's arguments filed November 15, 2010 have been fully considered but they are not persuasive for the reasons set forth in paragraph 5 above. In addition, Applicant's amendment necessitated the new ground(s) of rejection presented in paragraphs 3-4 of this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to H. (Holly) T. Le whose telephone number is 571-272-1511. The examiner can normally be reached on 12:30 p.m. to 9:00 p.m. (EST), Mondays to Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho can be reached on 571-272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/H. (Holly) T. Le/
Primary Examiner, Art Unit 1788

January 31, 2011